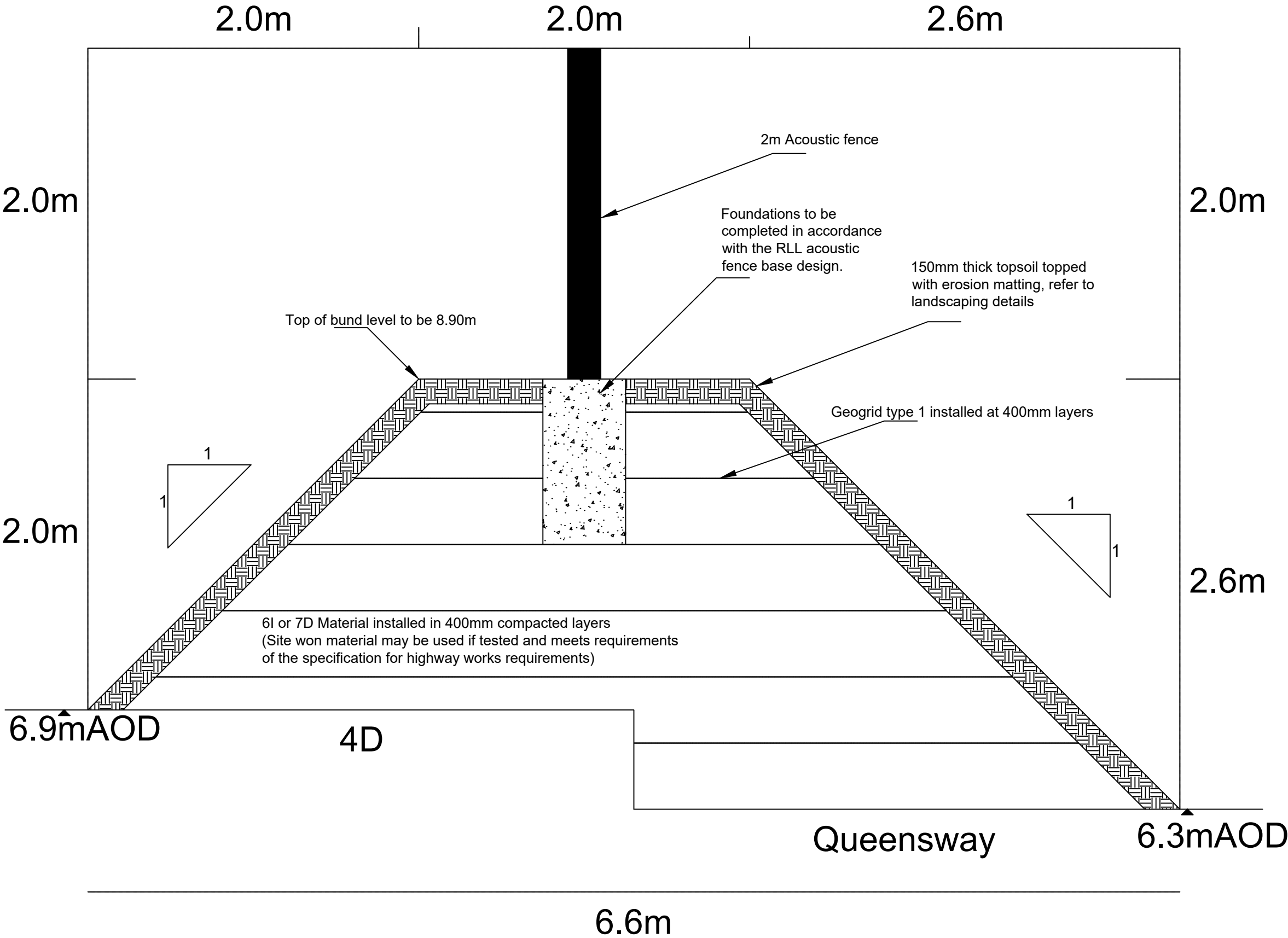


Material used to form the bund is required to be tested in accordance with the highway specification for earthworks and meet a minimum angle of internal friction of 28° and a minimum cohesion of 3kPa.



GENERAL NOTES

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND NHBC STANDARDS

ANY EXISTING DETAILS WHICH ARE SHOWN ON THIS DRAWING ARE FOR GUIDANCE ONLY AND ARE TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY VARIATIONS ARE TO BE RECORDED AND REPORTED TO THE ENGINEER IMMEDIATELY

ANY SOFT SPOTS DISCOVERED AFTER PROOF ROLLING SHALL BE REMOVED AND REPLACED WITH SUITABLE ENGINEERING FILL.

GENERAL SERVICES: CONTRACTOR TO VERIFY THE POSITION OF ALL SERVICES ON SITE. RECORDS OF KNOWN LIVE SERVICES TO BE INCLUDED IN HEALTH AND SAFETY PLAN. CONTRACTOR TO TAKE APPROPRIATE MEASURES PRIOR TO EXCAVATION. EXISTING SERVICES TO BE LOCATED BY HAND DUG TRIAL PITS.

NO ASSESSMENT OF THE SURCHARGE LOAD OF THE BUND (OR RESULTING SETTLEMENT) HAS BEEN UNDERTAKEN WITH REGARDS TO THE IMPACT OF ANY UNDERGROUND SERVICES PRESENT IN THE VERGE ALONG QUEENSWAY AND, SHOULD SERVICES BE PRESENT BENEATH OR IN CLOSE PROXIMITY TO THE BUND, THIS MAY NEED TO BE CONSIDERED.

GEOGRIDS TO BE INSTALLED AS PER MANUFACTURES GUIDLINES.

A COMPONENT OF SETTLEMENT IS ANTICIPATED ACROSS THE BUND. THE MAGNITUDE OF WHICH HAS NOT BEEN ASSESSED.

CREST LEVEL OF BUND SHOULD BE MONITORED FOR SETTLEMENT AND MAINTAINED AT A LEVEL OF APPROXIMATELY 8.9MAOD.

THE ACOUSTIC FENCE AND FOUNDATIONS SHALL BE INSTALLED WHEN SETTLEMENT IS SUBSTANTIALLY COMPLETE.

SITE WON MATERIAL SHOULD BE TESTED IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS.

MATERIAL MUST BE TESTED AND HAVE A MINIMUM INTERNAL ANGLE OF FRICTION OF 28° AND COHESION OF 3kPa.

THE LOCATION AND GENERAL ARRANGEMENT OF THE NOISE BUND IS SHOWN ON RUA ARCHITECTURE AND URBAN DESIGN H8914-PL-001.

Health & Safety Information Key

- Used to provide design specific safety information that may not be obvious to a competent contractor but may be useful.
- Used to restrict/prevent a possible action, eg. stop construction traffic from entering an area.
- Used to warn of significant design hazards, adding recommendations
- Used to encourage a positive action, e.g. use of robust protection for inspection chambers

P01	26/04/2024	FIRST DRAFT	RM	ET	
Rev	Date	Amendments	By	Chk	



Client
Barratt & David Wilson Homes
South Wales

Project
P18-669 Llanwern Reclamation

Drawing Title
4D Noise Bund

Status
FINAL

Scale	Drawn	Checked	Date
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A3@ 1:25 RM ET 26/04/2024

Drawing No. Rev.

18669-RLL-24-XX-DR-O-0571 P01

 Rodgers Leask Suite 6C, Second Floor, Helix Edmund St Liverpool	Project			Job no.		
	BDW South Wales - Llanwern Phase 4D			P18-669		
	Calcs for			Start page no./Revision		
	Acoustic Fence Base Design			1		
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	CHR	24/04/2024	CP	23/04/2024		

ACOUSTIC FENCE DESIGN

In accordance with BS 5975:2019

Tedds calculation version 1.0.00

Design summary

Overall design status; PASS
 Overall design utilisation; 0.797

Design zone B - Critical case

Description	Unit	Allowable	Applied	Utilisation	Result
Zone B Found. moment FoS		1.50	2.15	0.697	PASS
Zone C Found. moment FoS		1.50	2.66	0.565	PASS
Zone D Found. moment FoS		1.50	1.88	0.797	PASS

Site details

Site location; Cardiff
 Distance to the shoreline; $d_{\text{shoreline}} = 4$ km
 Site altitude; $A = 6$ m
 Basic wind velocity; $v_b = 21$ m/s
 Probability factor; $C_{\text{prob}} = 1$
 Terrain category; Country

Topography

Topographical factor; $T_{\text{wind}} = 1.58$

Foundation details

Foundation type; Post-in-hole
 Ground condition; Average
 Sloping ground next to foundation; Yes
 Foundation effective width; $D_{\text{Foundation}} = 600$ mm
 Planting depth; $P_{\text{Foundation}} = 1100$ mm

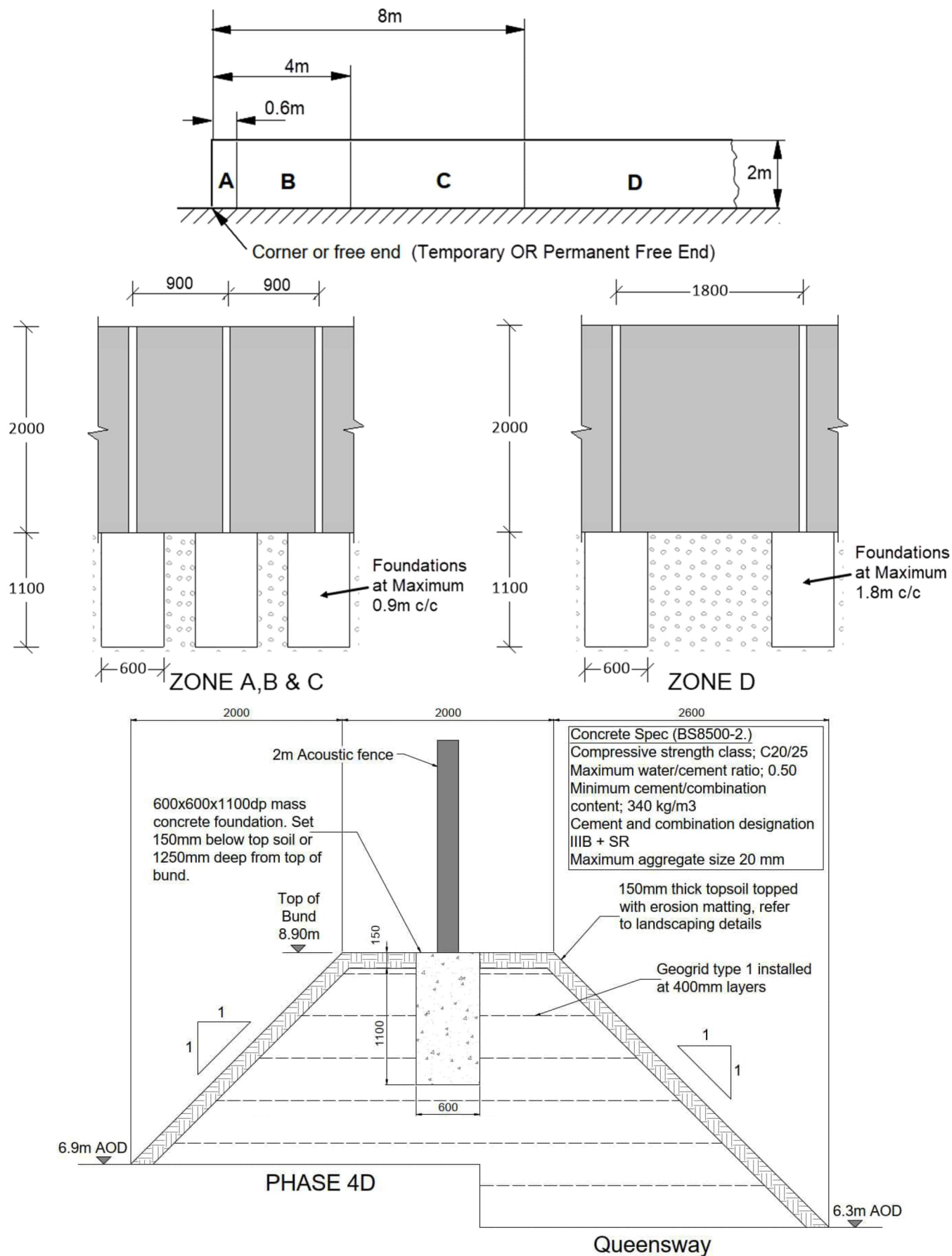
Peak velocity pressure

Wind factor, BS 5975 cl. 17.5.1.3; $S_{\text{wind}} = T_{\text{wind}} \times v_b \times (1 + A / 1000 \text{ m}) = 33.38$ m/s
 Probability factor, BS 5975 cl. 17.5.1.3; $C_{\text{prob}} = 1.0$
 Combined exposure factor, BS 5975 Table 16; $C_{\text{ef}} = 1.575$
 Peak velocity pressure, BS 5975 cl. 17.5.1.3; $q_p = 0.613 \text{ kg/m}^3 \times C_{\text{prob}}^2 \times C_{\text{ef}} \times S_{\text{wind}}^2 = 1.08 \text{ kN/m}^2$

Net pressure coefficients - Table B.2, Hoarding design guide

Effective length of hoarding; $L_{\text{ef}} = 250$ m
 In plan hoarding shape; Without returns
 Zone A; $C_{p,\text{net},A} = 3.40$
 Length of zone A; $L_A = 0.60$ m
 Zone B; $C_{p,\text{net},B} = 2.10$
 Length of zone B; $L_B = 3.40$ m
 Zone C; $C_{p,\text{net},C} = 1.70$
 Length of zone C; $L_C = 4.00$ m
 Zone D; $C_{p,\text{net},D} = 1.20$
 Length of zone D; $L_D = 242.00$ m

Project BDW South Wales - Llanwern Phase 4D				Job no. P18-669	
Calcs for Acoustic Fence Base Design				Start page no./Revision 2	
Calcs by CHR	Calcs date 24/04/2024	Checked by CP	Checked date 23/04/2024	Approved by	Approved date



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Liverpool

Project				Job no.	
BDW South Wales - Llanwern Phase 4D				P18-669	
Calcs for				Start page no./Revision	
Acoustic Fence Base Design				3	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
CHR	24/04/2024	CP	23/04/2024		

Post details

Height of posts; $H_{\text{post}} = 2000 \text{ mm}$

Spacing of posts; $S_{\text{post}} = 1800 \text{ mm}$

Wind forces - Annex B, Hoarding design guide

Shielding factor; $\eta = 1$

Maximum wind force; $F_{W,\text{Max}} = q_p \times C_{p,\text{net},B} \times \eta \times H_{\text{post}} = 2.88 \text{ kN/m}$

Maximum working wind velocity pressure; $q_{p,\text{work}} = 0 \text{ kN/m}^2$

Working wind force; $F_{W,\text{Work}} = q_{p,\text{work}} \times C_{p,\text{net},B} \times \eta \times H_{\text{post}} = 0.00 \text{ kN/m}$

Post

Zone B Maximum overturning moment; $M_{\text{Post}} = \max(F_{W,\text{Max}} \times H_{\text{post}} / 2, F_{W,\text{Work}} \times H_{\text{post}} / 2 + F_{\text{min}} \times H_{F\text{min}}) \times S_{\text{post}} = 4.07 \text{ kNm}$

Zone C Maximum overturning moment; $M_{\text{Post}} = \max(F_{W,\text{Max}} \times H_{\text{post}} / 2, F_{W,\text{Work}} \times H_{\text{post}} / 2 + F_{\text{min}} \times H_{F\text{min}}) \times S_{\text{post}} = 3.29 \text{ kNm}$

Zone D Maximum overturning moment; $M_{\text{Post}} = \max(F_{W,\text{Max}} \times H_{\text{post}} / 2, F_{W,\text{Work}} \times H_{\text{post}} / 2 + F_{\text{min}} \times H_{F\text{min}}) \times S_{\text{post}} = 4.65 \text{ kNm}$

Shear force in base; $Q_{\text{Post}} = \max(F_{W,\text{Max}}, F_{W,\text{Work}} + F_{\text{min}}) \times S_{\text{post}} = 5.19 \text{ kN}$

Zone B Foundation design

Shear force in base $Q_{\text{Post}} = \max(F_{W,\text{Max}}, F_{W,\text{Work}} + F_{\text{min}}) \times S_{\text{post}} = 4.07 \text{ kN}$

Overturning moment, eq. D2, TWf publ.; $M_{\text{max.Foundation}} = M_{\text{Post}} + 1.0 \times P_{\text{Foundation}} \times Q_{\text{Post}} = 8.54 \text{ kNm}$

Ground resistance factor, Table D1, TWf publ.; $G = 230 \text{ kN/m}^2$

Ground resistance moment, eq. D1, TWf publ.; $M_g = G \times D_{\text{Foundation}} \times P_{\text{Foundation}}^3 / 10\text{m} = 18.37 \text{ kNm}$

Actual factor of safety; $\text{FoS}_{\text{Actual.Mom}} = M_g / M_{\text{max.Foundation}} = 2.15$

Allowable factor of safety; $\text{FoS} = 1.5$

$\text{FoS} / \text{FoS}_{\text{Actual.Mom}} = 0.697$

PASS - Factor of safety against overturning is adequate

Zone C Foundation design

Shear force in base $Q_{\text{Post}} = \max(F_{W,\text{Max}}, F_{W,\text{Work}} + F_{\text{min}}) \times S_{\text{post}} = 3.29 \text{ kN}$

Overturning moment, eq. D2, TWf publ.; $M_{\text{max.Foundation}} = M_{\text{Post}} + 1.0 \times P_{\text{Foundation}} \times Q_{\text{Post}} = 6.91 \text{ kNm}$

Ground resistance factor, Table D1, TWf publ.; $G = 230 \text{ kN/m}^2$

Ground resistance moment, eq. D1, TWf publ.; $M_g = G \times D_{\text{Foundation}} \times P_{\text{Foundation}}^3 / 10\text{m} = 18.37 \text{ kNm}$

Actual factor of safety; $\text{FoS}_{\text{Actual.Mom}} = M_g / M_{\text{max.Foundation}} = 2.66$

Allowable factor of safety; $\text{FoS} = 1.5$

$\text{FoS} / \text{FoS}_{\text{Actual.Mom}} = 0.565$

PASS - Factor of safety against overturning is adequate

Zone D Foundation design

Shear force in base $Q_{\text{Post}} = \max(F_{W,\text{Max}}, F_{W,\text{Work}} + F_{\text{min}}) \times S_{\text{post}} = 4.65 \text{ kN}$

Overturning moment, eq. D2, TWf publ.; $M_{\text{max.Foundation}} = M_{\text{Post}} + 1.0 \times P_{\text{Foundation}} \times Q_{\text{Post}} = 9.76 \text{ kNm}$

Ground resistance factor, Table D1, TWf publ.; $G = 230 \text{ kN/m}^2$

Ground resistance moment, eq. D1, TWf publ.; $M_g = G \times D_{\text{Foundation}} \times P_{\text{Foundation}}^3 / 10\text{m} = 18.37 \text{ kNm}$

Actual factor of safety; $\text{FoS}_{\text{Actual.Mom}} = M_g / M_{\text{max.Foundation}} = 1.88$

Allowable factor of safety; $\text{FoS} = 1.5$

$\text{FoS} / \text{FoS}_{\text{Actual.Mom}} = 0.797$

PASS - Factor of safety against overturning is adequate

Project Llanwern Phase 4D				Job no. P18-669	
Calcs for Acoustic Fence Base Mix Design				Start page no./Revision 1	
Calcs by CHR	Calcs date 30/04/2024	Checked by CP	Checked date 30/04/2024	Approved by	Approved date

CONCRETE SPECIFICATION

In accordance with BS8500-1:2015 + A2:2019 incorporating corrigenda No.1 and No.2

Tedds calculation version 1.1.01

Element definition

Element description	Planted Base Foundation
Intended working life	At least 50 years
Type of concrete	Unreinforced, normal weight
Maximum aggregate size	20 mm

Exposure classes

Chemical attack (XA classes) - Table A.10

ACEC class	AC-3s (relatively serious consequences of failure)
Section width	t = 600 mm
Hydraulic gradient (note B)	Less than or equal to 5
Design chemical class	DC-3

Concrete requirements and specification

Consistence class	S3
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Minimum strength class

For design chemical class DC-3 - Table A.12	No minimum specified in code
Specified strength class	C20/25

PASS - The specified strength class is adequate

Maximum water/cement ratio with C20/25 concrete

For design chemical class DC-3 - Table A.12	0.50
Specified maximum water/cement ratio	0.50

PASS - The specified maximum water cement ratio is acceptable

Minimum cement content with C20/25 concrete

For design chemical class DC-3 - Table A.12	340 kg/m ³
For water/cement ratio of 0.50 - Table A.7	320 kg/m ³
Specified minimum cement content	340 kg/m ³

PASS - The specified minimum cement content is adequate

Recommended cements/combinations with C20/25 concrete

For design chemical class DC-3 - Table A.12	IIIB + SR
Recommended cement/combinations types	IIIB + SR
Specified cement/combination designation	IIIB + SR

PASS - The specified cement/combination is adequate

Project				Job no.	
Llanwern Phase 4D				P18-669	
Calcs for				Start page no./Revision	
Acoustic Fence Base Mix Design				2	
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
CHR	30/04/2024	CP	30/04/2024		

Designed concrete specification for Planted Base Foundation

The concrete shall be produced in accordance with BS8500-2.

Compressive strength class	C20/25
Maximum water/cement ratio	0.50
Minimum cement/combination content	340 kg/m ³
Cement and combination designation	IIIB + SR
Maximum aggregate size	20 mm
Consistence class	S3